ISSN (print) 0093-4666 © 2012. Mycotaxon, Ltd. ISSN (online) 2154-8889

MYCOTAXON

http://dx.doi.org/10.5248/119.17

Volume 119, pp. 17–25 *January–March 2012*

New species and record of *Sporidesmium* from southern China

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Abstract — Four species of *Sporidesmium* were collected from decaying twigs in tropical and subtropical forests in southern China. *Sporidesmium liquidambaris* sp. nov. on *Liquidambar formosana, S. antidesmatis* sp. nov. on *Antidesma ghaesembilla,* and *S. machili* sp. nov. on *Machilus chinensis,* are described, illustrated, and compared with closely related taxa. *Sporidesmium takashii* is recorded as new for the Chinese mycota.

Key words — conidial fungi, taxonomy

Introduction

The genus *Sporidesmium* (anamorphic *Pleosporales*) was established by Link (1809) with *S. atrum* Link as type species. Ellis (1958, 1971) defined the genus as having integrated, terminal, monoblastic, determinate or percurrent conidiogenous cells on distinctive, unbranched conidiophores, and acrogenous, solitary, transversely septate or distoseptate conidia. Under this generic concept, about 250 species are included in this genus. However, Sutton & Hodges (1979) and Hughes (1979) felt that *Sporidesmium* is heterogeneous, an opinion confirmed by Shenoy et al. (2006) who showed the polyphyletic nature of *Sporidesmium* and its allies. Kirk (1982) proposed the new genus *Sporidesmiella* P.M. Kirk for those species with cylindrical to cuneiform or obovoid, distoseptate conidia. Subramanian (1992) refined the generic concept of *Sporidesmium* in a stricter sense as 'conidiophores simple, determinate or irregular extending proliferations, conidia solitary, gangliar, acrogenous and euseptate', and proposed several novel anamorphic genera, including *Ellisembia* Subram., *Penzigomyces* Subram., *Repetophragma* Subram., and *Stanjehughesia* Subram., based on the absence/presence of conidiophores, type of conidiophore extension, and conidial septation (euseptate/distoseptate). Hernández-Guitiérrez & Sutton (1997) and Shoemaker & Hambleton (2001) further modified this approach by proposing *Imimyces* A. Hern. Gut. & B. Sutton, *Linkosia* A. Hern. Gut. &

B. Sutton, and *Imicles* Shoemaker & Hambl. However, Wu & Zhuang (2005) merged *Penzigomyces* into *Sporidesmium* and *Imicles* into *Ellisembia,* thereby expanding the generic concepts of *Sporidesmium* (euseptate) and *Ellisembia* (distoseptate) to include fungi with typically lageniform, doliiform, or nodose, percurrently extending conidiophores.

Sporidesmium is worldwide in distribution, usually found as a saprobe on rotten wood, dead branches, and decaying leaves of various plant species. (Ellis 1958, 1971, 1976, Wu & Zhuang 2005). During ongoing surveys of conidial fungi associated with woody debris in tropical and subtropical forests of southern China, four species clearly related to *Sporidesmium* sensu stricto were collected from decaying twigs. Three represent species new to science while the fourth is a new record from China.

Sporidesmium liquidambaris Jian Ma & X.G. Zhang, **sp. nov.** Fig. 1

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Conidiophora macronemata, nonramosa, 11–72 × 5.5–9.5 µm. Cellulae conidiogenae monoblasticae, integratae, terminales, per usque ad 7 extensiones lageniformes vel ampulliformes percurrentes. Conidia solitaria, obclavata, verruculosa, 11–26-euseptata, 110–165 × 20–24 µm, apicem versus ad 3–4.5 µm attenuata, basi truncata 4–5 µm lata.

Type: China, Fujian Province: Mount Wuyi, on decaying twigs of *Liquidambar formosana* Hance (*Hamamelidaceae*), 16 Aug 2009, J. Ma, (**Holotype** HSAUP H5059; **isotype** HMAS 146156).

Etymology: in reference to the host genus, *Liquidambar*.

Anamorphic fungi. Colonies on natural substrate effuse, brown to dark brown, hairy. Mycelium partly superficial, partly immersed in the substratum, composed of branched, septate, pale brown, smooth-walled hyphae, 1.5–3 µm thick. Conidiophores distinct, single or in groups, erect, unbranched, straight or flexuous, cylindrical, dark brown to black, smooth, septate, 11–72 × 5.5–9.5 µm. Conidiogenous cells monoblastic, integrated, terminal, brown to dark brown, smooth, 8.5–11.5 × 5–7 µm, with up to 7 lageniform or ampulliform percurrent extensions. Conidial secession schizolytic. Conidia holoblastic, acrogenous, solitary, straight or curved, obclavate, verruculose, brown to dark brown, apical cells pale brown or subhyaline, 11–26-euseptate, 110–165 µm long, 20–24 µm thick in the broadest part, tapering to 3–4.5 µm near the apex, 4–5 µm wide at the truncate base.

Comments –Among the known *Sporidesmium* species, *S. liquidambaris* resembles *S. ghanaense* M.B. Ellis (Ellis 1958), *S. matsutakashii* Subram. (Subramanian 1992), and *S. tengii* W.P. Wu (Wu & Zhuang 2005) in conidial shape. However, *S. liquidambaris* is distinguished from *S. ghanaense* (conidia 31–53 × 10–14 µm, 5–9-euseptate) and *S. tengii* (conidia 45–50 × 7–8.5 µm, 8-euseptate) by its larger conidia with more septa. It differs from *S. matsutakashii*

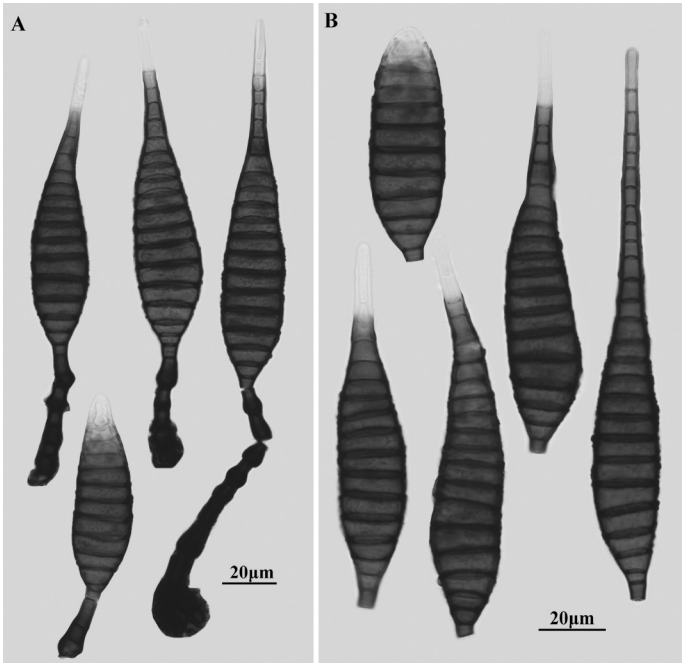

Fig. 1. *Sporidesmium liquidambaris*. A. Conidiophores with conidia. B. Conidia.

(conidia 9.5–14 μm wide) by its wider conidia that lack an apical mucilaginous appendage. In addition, the conidia of *S. liquidambaris* are verruculose while those of *S. ghanaense*, *S. matsutakashii,* and *S. tengii* are smooth.

Sporidesmium antidesmatis Jian Ma & X.G. Zhang, **sp. nov.** Fig. 2

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Conidiophora macronemata, nonramosa, 17–70 × 6–7.5 μm. Cellulae conidiogenae monoblasticae, integratae, terminales, determinatae, cylindrica. Conidia solitaria, obclavata, laevia, brunnea, 8–11-euseptata, 108–150 × 9–11 μm, apice rotundata, ad 3–4 μm lata, et muco subgloboso usque 12–24 μm diam. tecta, ad basim 4.5–6 μm lata.

Type: China, Hainan Province: Bawangling, on decaying twigs of *Antidesma ghaesembilla* Gaertn. (*Euphorbiaceae*), 11 Dec 2010, J. Ma, (**Holotype** HSAUP H5254; **isotype** HMAS 146157).

Etymology: in reference to the host genus, *Antidesma*.

Anamorphic fungi. Colonies on natural substrate effuse, brown to dark brown, hairy. Mycelium partly superficial, partly immersed in the substratum, composed of branched, septate, pale brown, smooth-walled hyphae, 1–2.5 μm

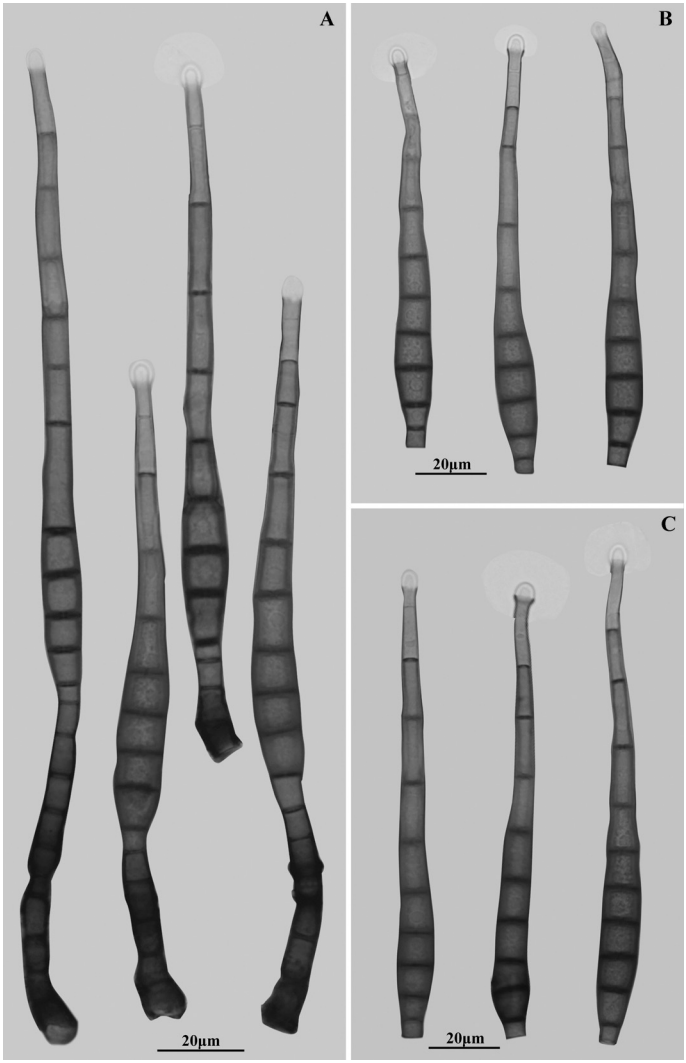

Fig. 2. *Sporidesmium antidesmatis*. A. Conidiophores with conidia. B–C. Conidia.

thick. Conidiophores macronematous, mononematous, single or in groups, erect, unbranched, straight or flexuous, cylindrical, brown to dark brown, smooth, septate, 17–70 × 6–7.5 μm. Conidiogenous cells monoblastic, integrated, terminal, determinate, cylindrical, brown, smooth, 4.5–7.5 × 5–6 μm. Conidial secession schizolytic. Conidia holoblastic, acrogenous, solitary,

straight or curved, obclavate, smooth-walled, brown, 8–11-euseptate, 108–150 µm long, 9–11 µm thick in the broadest part, tapering gradually towards the apex, base truncate, apex rounded, 3–4 µm wide, and invested in a subglobose drop of mucilage ca 12–24 µm diam, base 4.5–6 µm wide.

Comments – *Sporidesmium antidesmatis* superficially resembles *S. fragilissimum* (Berk. & M.A. Curtis) M.B. Ellis (Ellis 1958) and *S. eupatoriicola* M.B. Ellis (Ellis 1958). However, *S. antidesmatis* differs from *S. fragilissimum* (conidia 32–92 × 8–9 µm, verruculose) by its larger, smooth-walled conidia, and from *S. eupatoriicola* (conidia 60–195 µm long, apex 4–6 µm wide, 14–31-euseptate) by its slightly shorter conidia with narrower apices and fewer septa. In addition, the conidia of *S. antidesmatis* have an apical mucilaginous appendage while those of *S. fragilissimum* and *S. eupatoriicola* do not.

Sporidesmium machili Jian Ma & X.G. Zhang, **sp. nov.** Fig. 3

MycoBank MB 563264

Conidiophora macronemata, nonramosa, 15–60 × 3–5.5 µm. Cellulae conidiogenae monoblasticae, integratae, terminales, determinatae. Conidia solitaria, obclavata, ad longa rostrata, laevia, 5–7-euseptata, 70–160 × 5–7.5 µm, basi truncate, ad 1–1.5 µm lata, cellula apicali versus attenuate, pallide brunnea vel subhyalina, aseptata, rostro, ad usque 125 × 0.5–1.5 µm.

Type: China, Guangdong Province: Chebaling National Nature Reserve, on decaying twigs of *Machilus chinensis* (Benth.) Hemsl. (*Lauraceae*), 19 Oct 2010, J. Ma, (**Holotype** HSAUP H5407; **isotype** HMAS 146158).

Etymology: in reference to the host genus, *Machilus*.

Anamorphic fungi. Colonies on natural substrate effuse, brown, hairy. Mycelium partly superficial, but mostly immersed in the substratum, composed of branched, septate, pale brown, smooth-walled hyphae, 1.5–3 µm thick. Conidiophores macronematous, mononematous, single or in groups, erect, unbranched, straight or flexuous, cylindrical, brown, smooth, septate, 15–60 × 3–5.5 µm. Conidiogenous cells monoblastic, integrated, terminal, determinate, lageniform, brown, smooth, 13–23 × 3–4.5 µm. Conidial secession schizolytic. Conidia holoblastic, solitary, acrogenous, straight or curved, obclavate to long-rostrate, smooth-walled, brown to pale brown, 5–7-euseptate, 70–160 µm long (rostrum included), 5–7.5 µm thick in the broadest part, 1–1.5 µm wide at the truncate base, apex extended into a pale brown to subhyaline, aseptate, smooth rostrum, up to 125 µm long, 0.5–1.5 µm wide.

Comments – In terms of conidial morphology, *Sporidesmium machili* is similar to *S. circinophorum* Matsush. (Matsushima 1975), *S. takashii* (Subramanian 1992), *S. longirostratum* M.B. Ellis, and *S. tropicale* M.B. Ellis (Ellis 1958). However, *S. machili* differs from *S. circinophorum* (conidia 120–220 × 10–12 µm, 8–14-euseptate) and *S. tropicale* (conidia 80–250 × 12–15 µm,

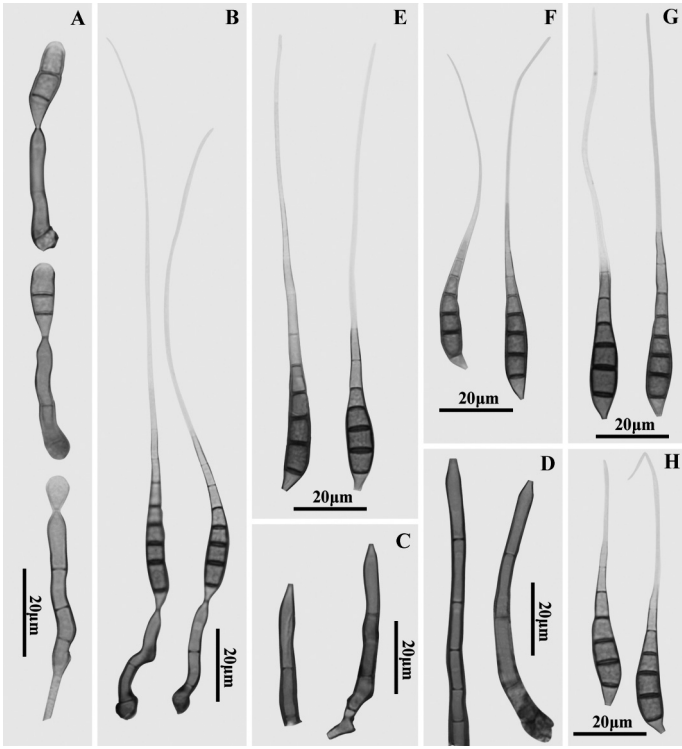

Fig. 3. *Sporidesmium machili*. A. Conidiophores with developing conidia. B. Conidiophores with mature conidia. C–D. Conidiophores. E–H. Conidia.

7–19-euseptate) by its smaller conidia with fewer septa, and from *S. longirostratum* (conidia 42–72 × 6–9 μm, 3–5-euseptate) by its longer and slightly narrower conidia with more septa. The conidia of *S. machili* are smooth-walled and are 5–7-eusepta while those of *S. takashii* are verruculose and 5–10-eusepta. In addition, the conidial rostrum in *S. machili* is filiform, pale brown to subhyaline and aseptate, which is obviously different from those of *S. circinophorum*, *S. takashii*, and *S. tropicale*.

Sporidesmium takashii Subram., Proc. Indian natn. Sci. Acad. B 58: 183, 1992. Fig. 4

Anamorphic fungus. Colonies on natural substrate effuse, brown, hairy. Mycelium partly superficial, partly immersed in the substratum, composed of branched, septate, pale brown, smooth-walled hyphae, 1–3 μm thick. Conidiophores macronematous, mononematous, single or in groups, erect, unbranched, straight or flexuous, cylindrical, brown, smooth, septate,

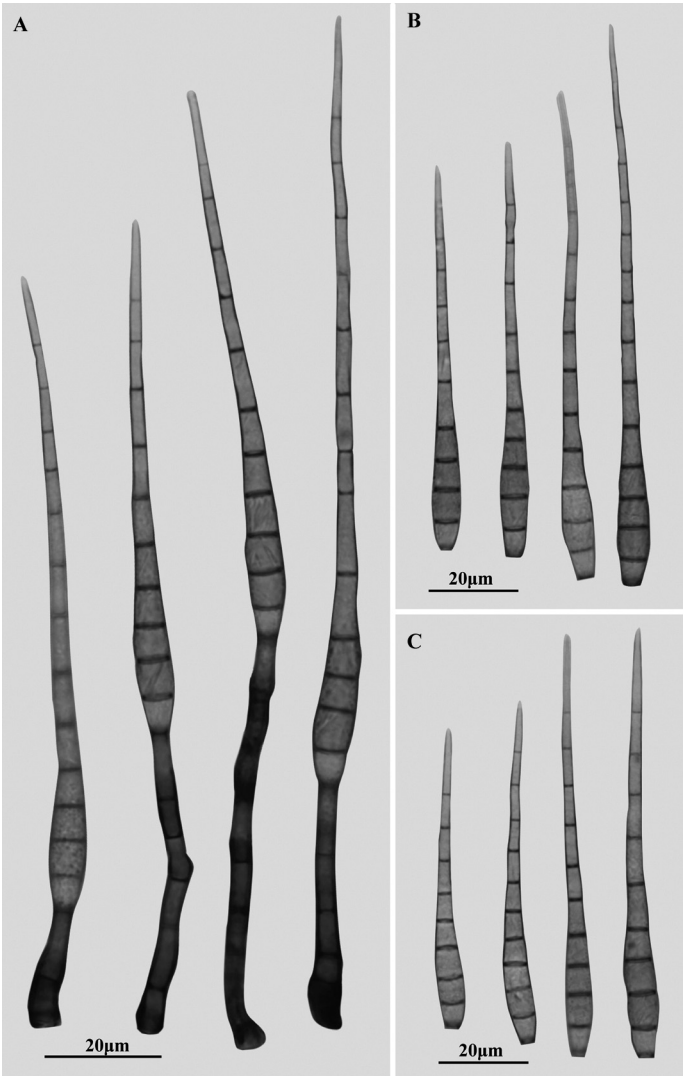

Fig. 4. *Sporidesmium takashii*. A. Conidiophores with conidia. B–C. Conidia.

13–60 × 3–5.5 µm. Conidiogenous cells monoblastic, integrated, terminal, determinate, cylindrical, brown, smooth, 10–16 × 3–4 µm. Conidial secession schizolytic. Conidia holoblastic, solitary, acrogenous, straight or curved, obclavate, rostrate, smooth-walled, brown to pale brown, 8–13(–16)-euseptate,

68–150 μm long, 5.5–7.5 μm thick in the broadest part, tapering to 1.5–2.2 μm near the apex, 2.5–4 μm wide at the truncate base.

Specimen examined: **China**, **Hainan Province**: Xinglong Tropical Botanical Garden, on decaying twigs of unidentified broad-leaved tree, 6 Dec 2009, J. Ma, HSAUP H5212, HMAS 146159.

Comments – Matsushima (1975) described this fungus as *Sporidesmium* sp. Subsequently, Subramanian (1992) assigned it as a new species, *S. takashii*, based on the earlier description. *Sporidesmium takashii* is morphologically most similar to *S. circinophorum* and *S. tropicale*. However, *S. takashii* conidia are distinctly smaller than those of *S. circinophorum* (conidia 120–220 × 10–12 μm) and *S. tropicale* (conidia 80–250 × 12–15 μm). In addition, *S. takashii* differs from *S. circinophorum* (conidia versicolored, apex 2.5–3.5 μm wide) and *S. tropicale* (conidia verruculose, apex 2–4 μm wide) in its concolorous, smooth-walled conidia with a narrower apex. Compared with the morphology of *S. takashii* described by Matsushima (1975) and Subramanian (1992), our collection fits well with the original description except for having more septa (8–16 vs 5–10) and smooth-walled conidia. This is the first report of this species in China.

Acknowledgments

The authors express gratitude to Dr Bryce Kendrick and Dr Eric H.C. McKenzie for serving as pre-submission reviewers and for their valuable comments and suggestions. This project was supported by the National Natural Science Foundation of China (Nos. 31093440, 30499340, 30770015) and the Ministry of Science and Technology of the People's Republic of China (Nos. 2006FY120100, 2006FY110500–5).

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